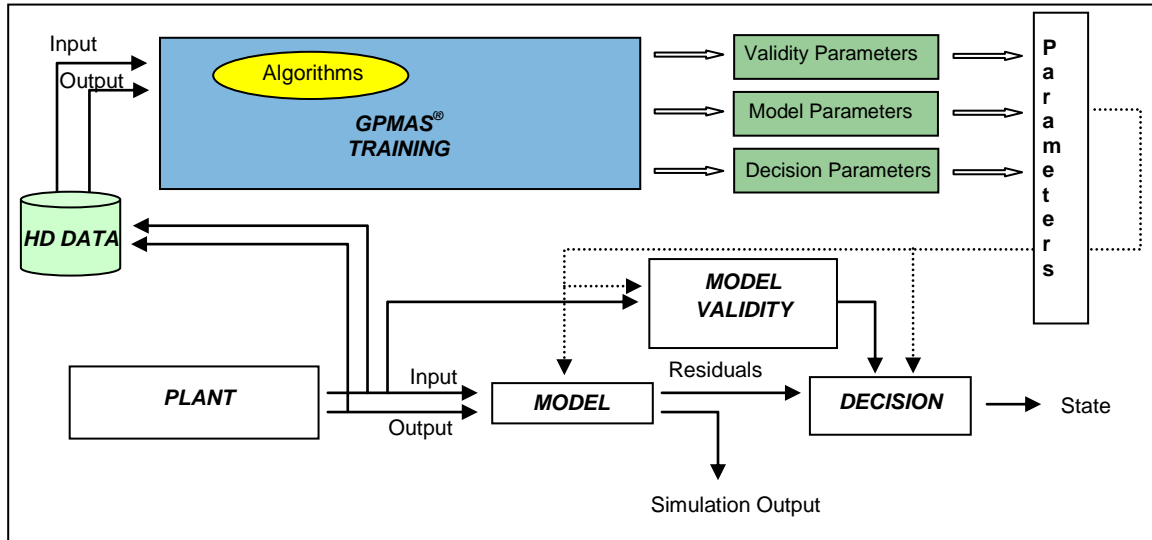


GP^{S.A.T.E.} MAS

A DATA ANALYSIS AND SIGNAL BASED SYSTEM IDENTIFICATION TOOL



OVERVIEW

GPMAS[®] – General Purpose Mathematical Application Server – is a MATLAB[®]¹ based tool for data analysis and model identification.

The user can perform data pre- and post-processing and use several black box model techniques for identifying the best-suited model for the specific application.

In addition the identified models parameter can be automatically exported as they are compatible with the corresponding models, compiled as DLLs.

SOFTWARE DESCRIPTION

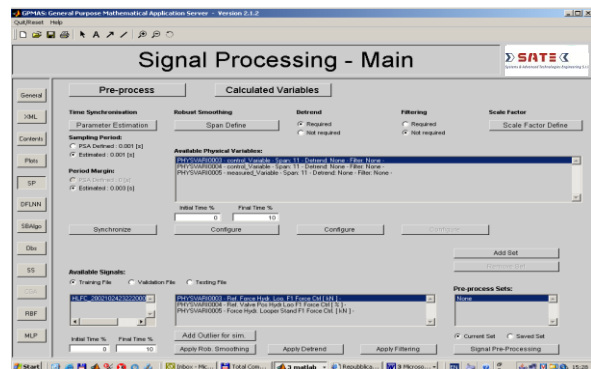
In particular the **GPMAS** allows:

- pre-processing signal analysis which include frequency analysis, filtering, outlier removal, etc.
- models identification, based on black-box techniques which include neural networks, state-space, observer based models, etc.
- validation and testing of customized fault detection algorithms.

Within the **GPMAS** environment is possible to:

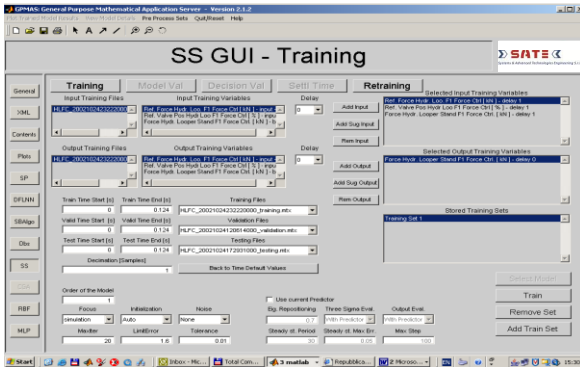
- load measured data coming from one or several tests on the same or different plants,

- perform a signal pre-processing (data synchronization, smoothing, de-trending, filtering and units conversion),
- combine signals together by custom made formulae for creating new ones to be used during identification (e.g. power using revolutions per minute and torque),
- perform system identification using several techniques, based on:
 - Signal Based techniques
 - Causal Graph approach
 - Observer based models
 - State Space models
 - Multi-Layer Perceptron Neural Networks models
 - Radial Basis Functions Neural Networks models
 - Dynamic Functional Link Neural Networks models



¹ MATLAB[®] is a product made by Mathworks Inc. (Natick, MA)

- create models using different techniques and compare them before choosing the most appropriate one,
- define the reliability of the identified model,
- define a symptom evaluation strategy.



DATA FORMAT

Input data formats are specified by an **XML** (eXtensible Markup Language) file, and provided either **ASCII** or **MAT** format or for the data signals.

In the **GPMAS** environment the user can save at any time the current session, that can be later reloaded to proceed with the work exactly from what it was stopped.

Besides, the processed signals can be saved in **MATLAB**® figures files (.fig).

DLLS EXPORT

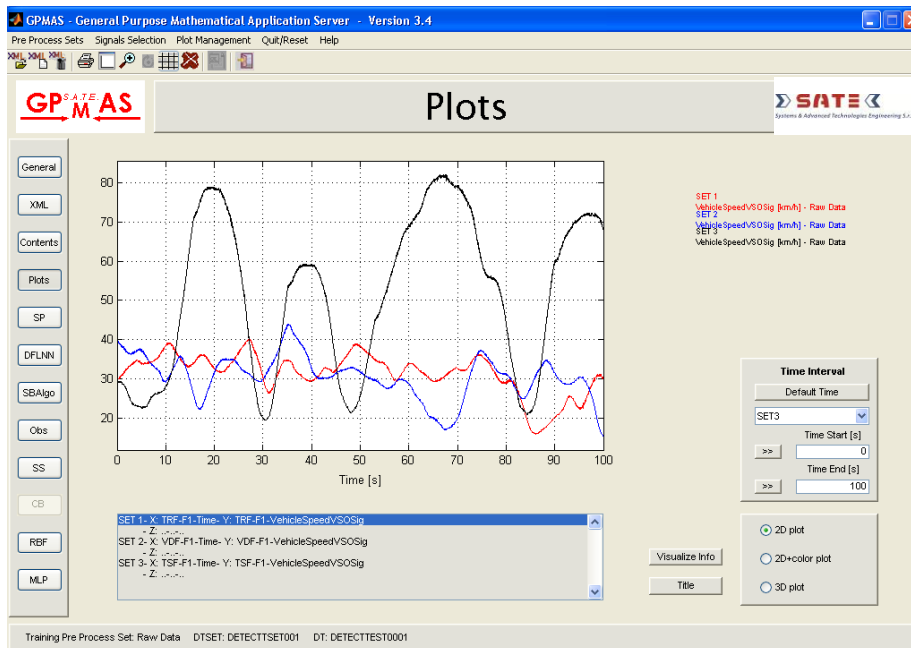
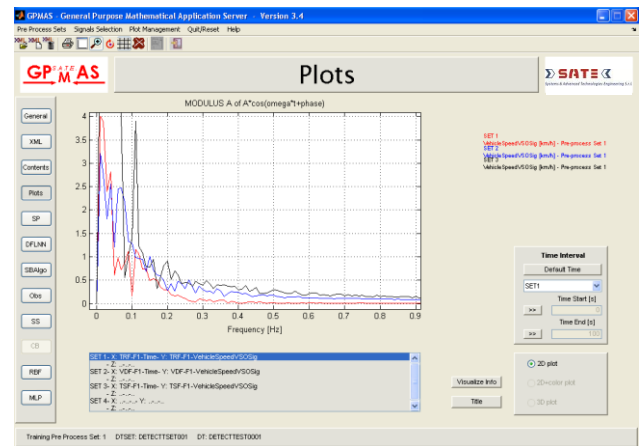
As part of this tool SATE developed for the implementation of the identified models, compiled code in the form of **DLLs** for the most common models.

These DLLs are compiled diagnostic libraries implementing generic functions or models which can be called by any software program with appropriate documented interface (i.e. input/output) procedures and syntax.

According to the system/process to be modelled, the models parameters will change but the code implementing such models will be the same.

These DLLs can be used by any device supporting DLLs technology, e.g. Windows based platforms.

The parameters exported from the GPMAS identification session are already fully compatible with these DLLs.



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